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Dear Sir:

Increased funds for a larger reserve of nuclear weapons, and for the development and testing of improved nuclear weapons, were requested by President Truman in his 1954 budget submitted to Congress last week in Washington. He also recommended an increase in funds for the development of nuclear power for naval vessels. He mentioned that the funds recommended for aircraft reactor research will enable that particular program to proceed at "an effective pace". In discussing nuclear energy expenditures, he stated that the rise, in past years, in such expenditures, has been due to the two major expansions authorized by Congress for the production of fissionable materials and atomic weapons. These increased expenditures, he observed, had been largely from construction work on the new facilities. He pointed out that the new obligational authority which he was recommending for 1954 was substantially less than for the current year, because the bulk of the construction funds for the expansion program had already been provided. This new obligational authority for 1954 amounts to $1.997 billion. Funds for 1954 operations were estimated at $2.7 billion. This compares with the 1953 expenditures of an estimated $2 billion, a 1952 actual expenditure of $1.67 billion, and a 1951 actual expendiure of $897 million.

A $40 million contract to construct a large chemical processing plant at Hanford Plutonium Works, Richland, Wash., has been awarded Blaw-Knox Co., Chemical Plants Div., Pittsburgh, by the USAEC, that agency said in Washington last fortnight. The new plant is part of Hanford's expansion (page 4, this LETTER). Vitro Corp. of America, New York, will be architect-engineer on the plant, and General Electric Co. will do basic design and engineering. The construction work is expected to cover about a two-year period.

Three major Swiss engineering concerns have now set up a joint nuclear research group to coordinate the various activities along these lines which previously had been handled independently. Brown-Boveri, Escher-Wyss, and Sulzer Brothers, the three firms in the new combine, have formed an atomic research committee. Serving on it are engineers and physicists; the group works in close collaboration with the Swiss Government's Atomic Energy Commission and Swiss universities. Research is now concentrated on the planning of a thermal nuclear reactor, which it is desired to construct in Switzerland.

Atomic power has progressed to the point where it is reasonable and proper to prepare for the time when it would stand on its own feet as an energy source, Dr. Karl P. Cohen, vice-president, Walter Kidde Nuclear Laboratories, Inc., stated in Garden City, L.I., last week at the opening of the company's building there.

An attack with modern weapons (atomic, biological, chemical, etc.) on the United States would be much more damaging than generally realized, according to a 1000 page report made after an 18-month national survey of civil defense by a group of nine universities. Some 286 specific recommendations were made, to provide the "adequate protection" the report said was possible to achieve.

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BUSINESS NEWS...in the nuclear energy field...

Attitudes Toward Nuclear Energy Shown in Survey-Business executives generally are highly cautious in their approach to nuclear energy for industrial purposes, a recent survey by the Joint Congressional Committee on Atomic Energy shows. Committee staff members interviewed eighty-two Government officials, company executives, attorneys, scientists, and others, during this past September, October, and November to obtain their views on industrial uses of nuclear energy.

The attitudes of the two subdivisions of those interviewed were summed up by the Committee as follows: In private industry, executives want assurances that the government will allow a private nuclear power industry to develop, that risk-taking will be compensated by profits for success and financial allowances for failure, and that regulations will be established with progress and profit in mind as well as safety and security. In Government, executives desire assurance that private industry is not attempting to create a subsidized industry which will always be directly dependent on public funds for its development and profitability. There is also the hesitancy to jeopardize the full strength of the nuclear energy project for accomplishment of military objectives.

The survey concerned itself with nuclear reactors which produce both heat and fissionable material, and with reactors which produce heat only insofar as they utilize for that purpose fissionable material or are of the breeder type.

Of those interviewed, a number favored the reactors which produce both heat and fissionable material, provided the operators were permitted to manufacture plutonium, tritium, and similar materials for sale to the Government at prices high enough to permit use of the heat developed in the process to generate electricity at costs competitive with conventional fuels--somewhere between 5 and 8 mills per kwh.

Favoring the reactors which produce heat only were public utility people. They felt that private companies had been too slow in their development of hydroelectric generation, and consequently had paid a high price for their lack of foresight. They did not want this to happen in the field of industrial nuclear power, permitting the Government and public bodies to dominate, if not monopolize, the field.

Shift in Nature of Nuclear Equipment Business Predicted-Industrial control apparatus based on artificially produced radioactive materials, will overshadow nuclear laboratory equipment in volume of business to be done, in 1953, W. A. Barbour, president, Tracerlab, Inc., Boston nuclear product firm, has now predicted. Barbour cited a few of the potentially large scale applications of such industrial control apparatus: non-destructive testing, or industrial radiography; control of liquid levels and specific gravity in chemical plants; routing of different petroleum products in long distance crude and finished products pipelines; sterilization of medical and food products; accelerated oil well exploration procedures; reduction of static electricity in textile and plastic man facturing; and induction of chemical processes by the catalytic action of ionizing radiation.

Barbour pointed out that when Tracerlab started out in 1946, there were 5 or 6 firms in the field. This number has now increased to more than 100. Twenty-five of these concerns are almost entirely devoted to developing and manufacturing nuclear measuring instruments and equipment, while the balance comprise divisions of larger concerns wanting a foothold in applied nuclear science. These firms had gross sales in 1952 of about $25 million, he estimated, largely in measuring and recording instruments, radiochemicals, and laboratory equipment for industrial and university research.

A few of these 100 or more companies making such instruments will combine, and some may fall prey to the intense competition that is developing, Barbour stated, Participation in the industrial control phase, of the apparatus picture, requires more capital, more experience, and sharper appraisal of markets than in the case of laboratory instruments and supplies, he said.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

FROM THE MANUFACTURERS- New pulse integration system, Model E-3 primarily designed for fast neutron radiation studies. The system consists of a multiple-channel discriminator which injects pulses into a scaling system in a manner that weighs them according to their amplitude. The resulting summation of this digital conversion furnishes an indication of integrated pulse current. When the system is set up for fast neutron dosimetry problems, gamma radiation pulses are eliminated by pulse amplitude discrimination and the pulse current integral is directly attributable to fast neutron reaction. Non-directional counters which can be supplied with the system are designed to approximate a tissue equivalent cavity. The amplitude of their recoil proton pulses is directly related to neutron energy. Provisions can be made for local or remote operation, and automatic preset time counting with data recorded. A precision pulser can also be supplied for checking overall operation of this pulse integration system.--Radioactive Products, Inc., Detroit 26, Mich.

New shielding container, Model E-31B, for shipping or storage of Cobalt-60 for radiography or other industrial high intensity sources. The new container will hold up to approximately 800 millicuries of activity. The radiation from an 800 mc Cobalt-60 source will be less than 10 mr/hr at one meter, it is said by the manufacturer. This container is made of an outer shell of 3/8" malleable iron, which is filled with lead. The lead filling, plus the iron outer surface, provides shielding which is said to be the equivalent of 4" of lead. A hinged, wedge-shaped cover lifts up from the center of the container and is designed to provide maximum protection for the radiographer, when he opens the container. This is accomplished by the cover pivoting up and back, thus erecting a 4" shield between the exposed source and the user. Weight of the container is 150-lbs; it is approximately 11-in. high. --Tracerlab, Inc., Boston 10, Mass.

New laboratory monitor, Model 1800, is a general-purpose count rate meter with provision for visual and/or aural indication. A front panel control permits selection of five different meter ranges: 300, 1000, 3000, 10000, and 30000 counts per minute. Aural volume control is also provided. Said to be accurate within plus or minus 5%; the instrument may be obtained with a GM tube and probe.--Berkeley Scientific Div., Beckman Instruments, Inc., Richmond, Calif.

New continuous, demonstration-type, cloud chamber, Model 1413, for class room use, which enables viewers to "see" radioactivity. Operation requires dry ice and isopropyl alcohol. Supplied with a small radium radiation source. Alpha and Beta particles from this source produce "tracks" as they pass through the saturated alcohol vapor within the glass chamber. Said to be easy to set up and to be dependable in operation, this cloud chamber is complete with a "sweep voltage" power supply which includes an illuminating spotlight.--Nuclear Instrument and Chemical Corp., Chicago 10, Ill.

IONIZING RADIATION & RADIOISOTOPES...applications & notes...

New Radioactive Source Installed- A radioactive source rated at 5,000 curies was installed last week at Columbia University, New York. The source, which is Cobalt-60, was produced by irradiation in the Brookhaven National Laboratory (Long Island) nuclear reactor. Some of the intended uses by investigators at Columbia include effects of radiation on microbiotic organisms, and on such food constituents as vitamins. The isotope was made available to Columbia under contracts the University holds with the USAEC.

Medical Research Utilizes Sulphur Isotope- The thyroid-stimulating hormone of the anterior pituitary gland has been successfully labeled with Sulphur-35. This marks the first time that it is possible to follow the course of the hormone, and to determine its role in controlling health or causing disease which may result from an endocrine disturbance, according to Martin Sonneborg, M. D., Sloan-Kettering Institute, New York. The paper in which this work was first reported by Dr. Sonneborg and his associates (Drs. W. L. Money, R. W. Rawson, and A. S. Keston) received the annual Van Meter award for an outstanding paper on thyroid disease from the American Goiter Association.

RAW MATERIALS...radioactive minerals for nuclear work...

UNITED STATES-Among those concerns in this country which are interested in extracting uranium minerals from phosphates, is the plant of the U. S. Phosphoric Products Division of the Tennessee Corp., at East Tampa, Florida, which is actively engaged at present in such extraction. A $10 million dollar plant is being erected for the same purpose by International Minerals & Chemical, in Florida. In addition, authorization to install uranium recovery facilities has been granted to Virginia-Carolina Chemical, and Davison Chemical. As to the process: it is reported to be complicated and costly. A ton of phosphate is estimated to contain one-seventh of 1% uranium, or approximately 2.85-lbs.

CANADA-At the Eagle Ace property of Nesbitt LaBine Uranium Mines, in the Beaverlodge area of Saskatchewan, the first phase of the underground work has progressed favorably. This is shown in an independent report made recently on the property by consultant, R. G. Hoiles. Mr. Hoiles points out that eight radioactive fractures were disclosed in this zone on the surface, seven of which contain visible pitchblende. On the 150-ft. level, 10 fractures have been opened and found to be radioactive, while on the 275-ft. level, five radioactive zones have been opened in the same zone, two containing visible pitchblende.....Three promising radioactive zones near the north end of the property of Iso Uranium Mines, on the St. Mary's Channel sector of the Athabaska area, have now been revealed by preliminary exploration. Plans are now being made for an intensified program, an official of the company states.

AUSTRALIA-Production of uranium salts for the United States and Great Britain, for their nuclear energy programs, has been in operation since October at a refinery plant in Adelaide. This was announced a fortnight ago by the Premier, Mr. Playford, and the Defense Minister, Mr. McBride.

AT ATOMIC CENTERS IN THE UNITED STATES...progress reports...

National Reactor Testing Station, Arco, Idaho-Fourteen bidders have shown interest in the $6 million construction job here involving an assembly and maintenance area and an administration area for the prototype aircraft propulsion nuclear reactor ground testing facilities. Bids for the work will be opened the 30th of this month (January).

Hanford Plutonium Works, Richland, Wash.-The second major expansion program of Hanford Works, involving more than $300 million, is now getting under way, Mr. C. R. Prout, General Electric vice-president in charge of nucleonic and atomic projects, recently stated. (General Electric operates Hanford Works under a USAEC contract.) A new Hanford Works laboratory, costing more than $14 million, is now near completion. This will include major laboratories for work with radiometallurgy, radiochemistry, biophysics, and pile research and development, as well as facilities for the various supporting services. Mr. Prout also pointed out that the continuous separation process, for separating plutonium from the parent uranium, after it leaves the reactors, is proving less costly than the batch process which it superseded. Some of the satisfactory features of the continuous process include continuous recycling of chemicals used in the separation znd purification steps, increased yield and improved product quality, and recovery for reuse of uranium which has been irradiated in the piles.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

The Elements of Nuclear Reactor Theory, by Samuel Glasstone and M. C. Edlund. This book was based upon the course of nuclear reactor theory given at the Oak Ridge School of Reactor Technology and is for engineers and others who plan to enter the field of nuclear reactor science and engineering. The main body of the book is devoted to the fundamental principles involved in the calculation of the critical conditions for thermal neutron chain reacting systems. 416 pages--D. Van Nostrand Co., New York 3, N. Y. ($4.80)

Uranium, Radium, and Thorium, by J. W. Clark and H. D. Keiser. Preprint from the Minerals Yearbook, 1950, to be issued by the Mines Bureau Dept. of the Interior. 17 pages.--Superintendent of Documents, Wash. 25, D. C. (10¢)

ATOMIC PATENT DIGEST...latest U. S. grants...

Radiation intensity meter. Comprises (in part) an electroscope having an ionization chamber, the casing of which is a metal of low atomic number, and a dry pile so connected and arranged that one pole is connected to this casing, with a resistor connected to the other pole of this dry pile. This resistor is connected to a quartz fiber mounted within the electroscope. A switch, connected across this resistor, comprises a cup-shaped member, with a needle member cooperating therewith. Resilient means force this needle away from the cup, while externally operable means may force the needle member into contact with the cup shaped member and short circuit the resistor. U. S. Pat. No. 2,623,184 issued Dec. 23rd, 1952, to D. J. Montgomery, Aberdeen, and K. A. Yamakawa, Bel Air, Md.

Ion sources. Comprises (in part) several ionizing devices, each adapted to receive material to be ionized, means for holding a supply of this material, and feeding means including a delivery device movable into the vicinity of each of said ionizing devices in succession, for advancing material from this supply means to each of the ionizing devices. U. S. Pat. No. 2,624,009 issued Dec. 30th, 1952; assigned to United States of America (USAEC).

Self-developing pocket radiation dosimeter. In a radiation detector (in part) an elongated housing of material opaque to light and penetrable to ionizing radiation, an elongated light-opaque sleeve secured longitudinally in this housing, and defining a space between the sleeve and the internal surface of the housing, with the sleeve opening at one end of the housing, and a radiation-sensitive tab element in the space around the sleeve, with means covering the other end of the housing. U. S. Pat. No. 2,624,011 issued Dec. 30, 1952, to Kurt G. Stern, New York.

Remote control pipetting unit. Comprises a vertically and horizontally movable carriage having a pipette adjustably mounted on it, cable and pulley means arranged for vertically and horizontally moving this carriage controllable from a remote point, a long flexible conduit connecting the pipette with stationary pressure controlling means to control the pressure within the pipette, and to control the flow of liquids to and from this pipette, and flexible conduit means for supplying liquids to this pipette. U. S. Pat. No. 2,624,656 issued January 6, 1953; assigned to United States of America (USAEC).

Apparatus and method for measuring magnetic flux, by comparison with a standard. Comprises (in part) a rotatable shaft, a search coil rigidly supported by this shaft, and rotatable in a magnetic field whose flux is to be measured, and means to produce a magnetic field of fixed flux density. A standard coil, with which comparison is made, is also rigidly supported by this shaft, and is rotatable in this magnetic field. U. S. Pat. No. 2,624,783 issued Jan. 6, 1953; assigned to United States of America (USAEC).

Method and apparatus for accelerating to high energy electrically charged particles. Apparatus for changing the energy of charged particles comprising (in part) means for establishing a magnetic field, means for projecting charged particles into this field along a path transversely thereof, means including a source of alternating electric potentials for revolving the particles in this magnetic field, and means for varying the ratio of the magnetic field strength to the frequency of the alternating electric potentials as said particles revolve, whereby the resonant energy of the particles is changed. U. S. Pat. No. 2,624,841 issued Jan. 6, 1953; assigned to United States of America (USAEC).

Ion source. In combination with an ionic mass separating device comprising a closed tank housing an ion source unit including structure providing a charge reservoir and a communicating charge ionizing chamber, a normally closed receptacle containing a charge and positioned within said charge reservoir, and means controllable from the exterior of this tank for opening this receptacle. U. S. Pat No. 2,624,845 issued January 6, 1953; assigned to United States of America (USAEC).

Sincerely,

The Staff,
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